



Debugging: the View from Above

Adapted from David J. Agans

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9 Indispensable Rules for Finding the Most Elusive Software and Hardware Problems

- Understand The System
- Make It Fail
- Quit Thinking and Look
- Divide and Conquer
- Change One Thing At A Time
- Keep An Audit Trail
- Check The Plug
- Get A Fresh View
- If You Didn't Fix It, It Ain't Fixed

+ Understand The System

- Read the Manual (Datasheet)
- Read everything in depth
- Know the Fundamentals
- Know the Road Map
- Understand your tools
- Look up the details

+ Make It Fail

- Do it again
- Start at the beginning
- Stimulate, not simulate, the failure
- Shake, rattle, and roll
- Record everything: find the signature
- Don't trust statistics too much
- Never throw away a debugging tool

+ Quit Thinking and Look

- See the failure
- See the details
- Build instrumentation in
- Add instrumentation on
- Don't be afraid to dive in
- Watch out for Heisenberg
- Guess only to focus the search

+ Divide and Conquer

- Narrow the search– successive approximation
- Get the range
- Upstream or Downstream?
- Easy-to-spot test patterns
- Start with the bad
- Fix what you know about
- Don't fix what ain't broken

+ Change One Thing At A Time

- Isolate the key factor
- Grab the brass bar with both hands
- Change one test at a time
- Compare it with a good one
- Determine what you changed since the last time it worked

+ Keep An Audit Trail

- Write down what you did, in what order, and what happened
- Understand that any detail could be important
- Correlate events
- Design audit trails are also good for testing
- Write it down!

+ Check The Plug

- Question your assumptions
- Start at the beginning
- Test the tool

+ Get A Fresh View

- Ask for fresh insights
- Tap expertise
- Listen to experience
- Know that help is around you
- Don't be proud
- Report symptoms, not theories
- Realize that you don't have to be sure

+ If You Didn't Fix It, It Ain't Fixed

- Check that it's really fixed
- Check that it's really your fix that fixed it
- Know that it **never** goes away by itself
- Fix the cause
- Fix the process



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